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# COST BENEFIT ANALYSIS OF USAID/ RWANDA'S DAIRY VALUE CHAIN INTERVENTION: FINAL SUMMARY FINDINGS

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# **Learning, Evaluation and Analysis Project-II (LEAP-II)**

## **Cost Benefit Analysis of USAID/Rwanda's Dairy Value Chain Intervention**

### **Final Summary of Findings**

Contract Number:

AID-OAA-I-12-00042/AID-OAA-TO-14-00046

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# COST-BENEFIT ANALYSIS OF USAID/ RWANDA'S DAIRY VALUE CHAIN UNDER THE RDCP II PROJECT: SUMMARY FINDINGS

Table 1. Headline Figures

		ERR <sup>1</sup>	ENPV <sup>2</sup>
Rwanda Perspective		23.0%	US\$ 48.5 mill
	<i>PV of USAID Investment</i>		US\$ 12.4 mill
USAID Perspective		18.7%	US\$ 36.4 mill

## PROJECT DESCRIPTION

The USAID/Rwanda Dairy Competitiveness Program II (RDCP II) project aims to increase the competitiveness of Rwandan dairy products in regional markets and to improve rural households' incomes by increasing quality and efficiency throughout the dairy value chain (VC). The project falls within a larger portfolio of U.S. Government interventions in Rwanda to improve food security under the *Feed the Future* initiative. The RDCP II project began in 2012 and is expected to finish in 2017.

The RDCP II project is being implemented in line with Government of Rwanda's (GoR) strategic objectives. These include Vision 2020, the Economic Development and Poverty Reduction Strategy (EDPRS), the Strategic Plan for the Transformation of Agriculture in Rwanda (PSTA II), and the Agriculture Sector Investment Plan (ASIP), each of which include the objectives of enhancing the dairy VC and increasing domestic consumption of milk-based products. The RDCP II project also works in close collaboration with the "Girinka/One Cow Per Family" program.

## BENEFICIARY PROFILE

RDCP II provides direct support to three groups of farmers:

1. *Vulnerable households* – These households are extremely poor, with very limited or no landholdings and no livestock, identified by their communities as candidates for

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<sup>1</sup>Internal Rate of Return (IRR) is the (break-even) interest rate at which investors can expect to receive positive returns. The Economic Rate of Return (ERR) differs from the Financial Rate of Return (FRR) in that it takes into account the effects of factors such as price controls, subsidies, and tax breaks to compute the actual cost of the project to the economy.

<sup>2</sup> In finance, the net present value (NPV) is defined as the sum of the present values (PVs) of incoming and outgoing cash flows over a period of time. Economic Net Present Value (ENPV) then looks at incoming and outgoing resources which are defined beyond just cash flows and are described as benefit and cost resource flows, respectively.

support under the “One cow per family” program. The RDCP II project has provided direct support to 9,034 farmers in this category.

2. *Households* – These farmer households have limited land holdings allocated to crop cultivation and one or two cows. The project has provided direct support to 13,844 farmers in this category.
3. *Model farmers* – These group includes better-off households with five to ten head of cattle and at least two hectares of land, allocated to grass production. The project has provided direct support to 839 farmers in this category, of which 55 percent were male and 45 percent were female. Model farmers were also involved in the training of a further 16,419 farmers, who are not included in this analysis.<sup>3</sup>

## KEY RISK AREAS

The biggest milk processing plant, Inyange Industries, is the main, and in many instances the only, purchaser of raw milk. This monopsony power to set the price of raw milk represents a significant risk factor to RDCP II activities over the long term. Any interventions that create an additional market for the raw milk, such as promotion of a small scale cheese, yogurt, and butter production or milk collection center equipment (such as milk pasteurizing equipment) may create much needed market alternatives for the farmers and help to absorb ever growing milk production.

The use of artificial insemination (AI) services is low, at just 58% percent of farmers with access to the service.<sup>4</sup> Timely access to such services is a critical factor in the reproductive performance of dairy cattle. The low adoption rate can be partially explained by the limited accessibility of AI services in some parts of the country, representing a risk variable to project returns. The use of AI is key to improve the breeding and therefore the production capacity of the animals. In-breeding at the local level restricts production capacity over time. However, AI cannot be successful alone in improving production. Nutrition and proper veterinary services are also necessary to see the benefits.

A forthcoming Ministerial Order regulating the handling, collection, transport, and sale of milk is expected to boost the quality of raw milk throughout the VC.<sup>5</sup> The ministerial order requires that milk traders have milk testing equipment, steel made cans, license to transport milk and license to sell milk. The order, however, may push a number of milk collectors and milk kiosks out of the market, which may result in a short-term negative effect on the farm- gate price of milk.

## KEY RECOMMENDATIONS

This report makes three key recommendations.

1. **First, the RDCP II project’s dual focus on expanding milk production at the farm level and improving milk quality throughout the VC has resulted in positive economic returns.** However, future efforts should be directed toward increasing the market for raw milk. This can be achieved by promoting local, small-scale production of pasteurized milk, butter, yogurt, cheese, and other dairy products. The domestic production of butter, cheese, and yogurt were piloted by the project and found to be

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<sup>3</sup> The group of farmers trained by model farmers was 63 percent male and 37 percent female; average household size was four and average dairy herd was 2.8 cows/household.

<sup>4</sup> RDCP II Midterm Project Evaluation Report.

<sup>5</sup> The ministerial order is expected to become effective in the near future.

highly successful. There is strong evidence to suggest that major gains from market creation are passed to dairy households through an increase in the farm-gate price for milk.

2. **Second, a critical constraint to the expansion of dairy herds is limited landholdings.** This issue can be addressed through the introduction of legumes, which enable the feeding of more cattle from the same acreage. Trainings on grass-conservation schemes to help stabilize seasonal fluctuations in the milk supply.
3. **Third, ownership of milk collection center facilities should be transferred from the GoR to farmer cooperatives.** This will improve farmers' access to credit while incentivizing milk cooperatives to reinvest financial returns and to further improve their productivity and profitability.

## METHODOLOGY AND MODEL DESCRIPTION

The Integrated Investment Appraisal (IIA) methodology is used to evaluate both the financial and the socio-economic effectiveness of FED interventions and assess their impacts from various perspectives. IIA is the only single-model approach to quantify the impact of every project-related transaction, from the investor (USAID) to tax revenues, fiscal expenditure, consumers, and the environment. Major development banks, donor agencies, and public investment units use this methodology in project evaluations.

Dairy farmer cash-flow profiles<sup>6</sup> are prepared, providing a basis for economic, stakeholder, and risk analysis of dairy farming activities. The backbone of the model is the dairy herd projection table. The table projects evolution of the dairy herd using the parameters of reproductive performance of dairy cattle and agronomic formulas. Improvement of these parameters due to the project interventions increases efficiency and productivity of the dairy herd. The number of beneficiaries that received RDCP II support is used to derive an aggregate economic resource flow statement.<sup>7</sup> The USAID investment cost is then compared with the net incremental economic benefits of the RDCP II project to derive the net present value (NPV) of the USAID investment.<sup>8</sup>

This analysis is applied to a 20-year evaluation period, 2012-32, and compares “with-project” and “without-project” scenarios on an incremental basis, with real financial and economic discount rates set at 12 percent. The model is constructed on an annual basis with a base year of 2015. The results are expressed in 2012 prices. The model first derives nominal cash flows, which are then discounted using corresponding price indexes to derive real cash-flow statements. The analysis uses World Bank inflation and exchange rate data.

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<sup>6</sup> These are farm level budgets of expenses and income.

<sup>7</sup> The economic resource flow statement is based on the financial cash flow statement but also takes into account the effects of factors such as price controls, subsidies, and tax breaks, consumer gains and other distortions.

<sup>8</sup> The USAID investment is not a cost from the Rwanda economy point of view. These costs are those that are external to economy resources that otherwise (if the project is not implemented) would not be available to the country. The economic gains from USAID assistance, in turn, benefit only Rwanda. Given that achievement of these economic benefits was the objective of the USAID investment, from the USAID point of view the net benefits are calculated by subtracting the cost of the interventions from the net economic benefits to Rwanda. Please refer to Table 1.